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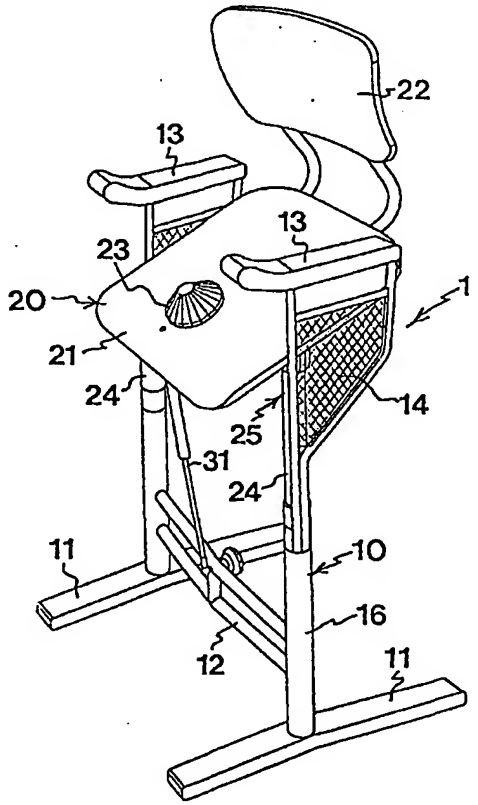
(54) Title: A CHAIR WITH A STANDING-UP AND A SITTING-DOWN AID

(57) Abstract

A chair for facilitating disabled person's sitting down and rising has a support (10) and a seat (20). The seat (20) can be risen and lowered, mounted at the support (10) and is spring prestressed towards an upper position by at least one spring means (32). Furthermore the seat (20) is tiltable between a substantially horizontal sitting position and a position tilting forwards. Two elbow-rests (13) are firmly mounted to the support (10) at opposed side edges of the seat (20), to facilitate for a user to be supported thereby for sitting down or rising.



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A CHAIR WITH A STANDING-UP AND A SITTING-DOWN AID.

Technical field

The present invention relates to a chair for disabled persons with related capability of movement, according to the preamble of patent claim 1.

State of the art

Persons with a limited capability of movement, especially with bad leg strength, like elder and disabled persons, often have problems when sitting down in chairs and when rising from chairs.

In US-A- 4 690 457 and in US- A- 4 907 303 there are disclosed chairs, which have a seat, that is tiltable forwards around a turning axis at the foremost edge of the seat, and that is spring prestressed to the forwards tilting position

With designs of this art a person can get assistance to rise more easily from the chair, but only during the first often most difficult portion of the rising movement.

No assistance is provided during the latter portion of the rising movement, next to standing. No assistance is provided during the first portion of a movement for sitting down in the chair, which is often demands considerable effort and means that the person sits down quite quickly. The two designs mentioned do not prevent this, even if the sitting movement is damped to some degree.

The object of the invention

The object of the invention is to facilitate sitting down from standing as well as rising from a sitting position to standing for persons wit a limited capability of movement.

Abstract of the invention

This an other objects, which will be obvious from the following description have been achieved by the invention by a chair of the art mentioned introductorily and which furthermore has the characterising features given in the characterising part of patent claim 1.

The invention relates to a chair for facilitating for persons with limited capability of movement to sit down and rise. The word chair in relationship to the

invention shall be understood broadly and comprises sitting aids on which one sits and which have the characterising features given in the patent claims.

The chair has a seat, which can be risen and lowered and is spring prestressed towards an upper position by at least one spring means. Thus a lifting- and lowering function is provided, whereby a user of the chair gets aid, both when sitting down and when rising. Rising and lowering of the seat coincides with the natural movement when a person rises and sits down.

The seat is spring prestressed towards an upper position by at least one spring means. Thus the need for external force sources is avoided and a user can get assistance when sitting down and when rising, during the complete movement between standing and sitting position. The chair has elbow- rests firmly fixed to the support. A user can thus get support from these by the hands to sit down resp. rise.

The seat is tiltable between a substantially horizontal sitting position and a position tilting forwards. The declination of the seat can thereby follow the movements of the user during sitting down and rising.

A preferred embodiment of the invention means, that the seat is tiltable around a geometric axis located between the fore edge and the back edge of the seat, preferably centrally located. Thereby vertical loads from the weight of a user are outbalanced and the declination of the seat is automatically adapted to the natural pattern of movement during sitting down and rising.

An especially preferred embodiment means that the seat is provided to tilt forwards when it is at the upper position, i e the end position. Thereby sitting down from a standing position of a user in a first interval of movement is primarily facilitated, but also rising to standing position is facilitated. A declination forwards of about 20- 30 degrees in the upper position of the seat has proven to be extraordinarily suitable.

In another especially preferred embodiment the seat is arranged to take a substantially horizontal attitude in the lower position, i e the other end position. Thus it is warranted, that a user sits comfortably and steadily.

A short description of the drawings

In the following the inventions described more in detail reference being made to the enclosed drawings, which show- as an example- preferred embodiments of the invention.

'Fig 1 shows, in perspective, a first embodiment of a chair according to the invention.

Fig 2 shows a side view of the embodiment shown in figure 1, with certain portions removed in order to show internal details .

Fig 3 shows, in perspective, a second embodiment of a chair according to the invention.

Fig 4 shows a side view of the embodiment shown in figure 3, with certain portions removed and with certain parts enlarged in order to show internal details,

Description of embodiments of the invention

In fig 1 and 2 a first embodiment of a chair 1 according to the invention is shown. The chair comprises a support, generally marked by 10, and a seat generally marked by 20, which can be risen and lowered, mounted thereon. The chair is shown with the seat in the upper position.

The support 10 comprises two upright standing legs 16, each of them with a foot 11 at the lower end. The two feet extend in a direction forwards- backwards in order to give the chair 1 stability in the same direction. The two legs 16 are provided at each sides of the seat 20 and are connected by a transversal beam 12 to the lower portion of the legs 16 and via the seat 20 at an upper portion of the legs 16. At the top of the legs 16 there are elbow- rests 13, by which a user can take support in order to sit down soft and in order to rise. Immediately below the elbow - rests there are squeeze protections in the form of a net construction or a panel to prevent a user from squeezing his fingers when the seat 20 is lowered. The seat 20 has a sitting surface 21 and is provided with a back - rest 23 which is firmly mounted at the seat 20 to follow its movement. In the fore portion of the seat the sitting surface 21 is provided between its side edges with an elevation in the form of a cone 23. This cone acts as a glide stop to support and to prevent

a user from gliding from the sitting surface 21 when the seat 20 is in an upper position. The cone 23 is releasably fastened to the seat by the aid of a bolt, provided with a handle, which bolt extends through a hole in the seat.

The seat 20 is at its lower side, at the side edges, fastened turnable at a seat holder 25, which comprises two tube-formed leg means 24 and a sitting support 26, which extends backwards from the leg means 24 and is fastened to these, non- turnable. The seat 20 is tiltable between a position, tilting forwards, as is shown at the figures, and a substantially horizontal position, in which the seat 20 is located when somebody sits at the chair 1.

Tests with different embodiments of the invention have proven, that a suitable declination of the seat for best function should lie in the interval 15- 40 degrees and even better in the interval 20- 30 degrees. For the moment being a seat declination of about 25 degrees is preferred. These tests have also shown, that the distance between the upper and lower positions of the seat should be 17 - 24 cm, going out from a suitable sitting height in the lower position. For the moment being a sitting height of about 44 cm and a distance of about 20 cm between the upper and lower positions of the seat are preferred. Together with said measures it is preferred, that the elbow- rests are provided at a height between 70 cm and 75 cm, whereas 72 cm is especially suitable.

At the lower side of the seat 20 there is a support means 27, which together with the lower side of the seat 20 embraces the sitting support 26, so that the lower portion of the support means 27 is in contact with the lower surface of the sitting support 26 when the seat 20 tilts forwards and so that the lower surface of the seat is in contact with the upper surface of the sitting support 26 when the seat 20 is in the horizontal position. As the support means 27 embraces the support 26, squeeze risks are avoided.

The two tube- formed leg means 24 of the seat holder 25 are glideably inserted in the legs 16, which are also tube- formed. Between the the leg means 24 and the legs 16 there are pressure springs in the form of gas springs 32. These are provided vertically and are shown fully extended. When the seat 20 is pressed downwards by a user the springs 31 will be compressed.

Between the transversal beam 12 of the support 10 and the lower edge 20 of the seat, in front of the journalled fixation at the seat holder, there is a guide means in the form of a smaller gas spring 31. The spring 31 has two functions, in the upper position of the seat 20 the spring 31 is extended next to its full length and acts as a traction means to keep the foremost edge of the seat 20 down, in order to let the seat 20 tilt forwards. In the lower position of the seat 20 the spring 31 is compressed next to its shortest length and acts as a pushing means to hold up the fore edge of the seat 20, in order to let the lower edge tilts in relationship to the seat support 26. In intermediate positions the spring 31 warrants a soft change of the declination of the seat 20. The function of the spring 31 may also be achieved in other ways, e g by separate traction- and pushing means . In different embodiments of the invention it may also be suitable to arrange the spring 31 between one of the legs 16 and the fore portion of one side edge of the seat or to provide two springs 31, one at each side.

The spring forces of the vertical springs 32 is adapted to give a substantial contra action against the lowering movement and unload the force, with which a user must hold in the elbow- rests 13 when sitting down, and give a corresponding, substantial helping aid when rising from a sitting position. The spring force must not be so great, that a user cannot press down the seat 20 by his own weight and does not sit steadily when the springs 32 are compressed. Tests have shown that the combined lifting force of the springs 32 preferably should be of the order 60%-80 % of the weight of a user. The spring force of the springs 32 may be set.

As the back - rest 22 follows the declination of the seat 20 forwards in the upper position a user gets support for the back already when he/she is going to sit down. Thereby the nuisance is avoided or reduced, that a user with limited capability of movement may feel when sitting down backwards.

The seat 20 may be lockable in the lower position to warrant that a user sits steadily without the need of sitting still.

In figs 3 and 4 a second embodiment, a chair 2 adapted to the utilisation at a WC. The reference numbers that refer to similar details have in the following been given the same reference numbers, and only those details, that differ in relationship to the first embodiment are described in the following.

The seat 20 is designed like a sit ring 21a, which at its lower position is intended to support directly to a WC -chair (not shown) and to replace a common sit ring. At the lower side of the sit ring 21a there is a buffer means 28, preferably of rubber or some similar material, as support at a WC- chair. Thereby there is an extra damping when the seat 20, when lowering, gets in contact with the WC-chair. Squeeze risks between the seat 20 and the WC- chair are also avoided.

At the journalled fixation of the seat 20 at the seat holder 25, inat the upper portion of the tube- formed means 24, there is leaning support in the form of taps 29, which are non- turnably connected to the seat 20, as is shown enlarged in fig 4.The leaning supports 29 are provided by defining end positions for the declination of the seat 20 by contact with inside of the tube- formed means 21. The declination interval between horizontal sitting position (shown dashed) and forwards tilting position (whole line) is determined by the length of the leaning supports 29 and a bevelling turned backwards together with the inner diameter 1.of the tube- formed means 24 and the location of the turning point.

The transversal beam 12a of the support is designed like a forwards bent bow to make it possible for the chair 2 to be led backwards to a WC-chair so that the seat 20 is above it. At the middle of the beam 12a there is a buffer means 15 for contact with a fore, lower portion of the WC- chair. The distance of the buffer means 15 to the beam 12a can be set by the aid of a handle 17.

The seat 20 may be lockable in the lower position, e g with the aid of some means provided between the seat holder 25 and the support 10. This is a great advantage at this embodiment to facilitate drying after a WC visit.

The seat 20 of the chair 2 can also be lockable vertically at one or more elevations above a WC in order to function, also as a WC- chair elevator.

The variety of possibilities for usage is a great advantage of the invention. The invention can, in extension to the embodiments described above, be applied to wheel- chairs by providing the support with wheels.

Patent claims

A chair for facilitating disabled person's sitting down and rising, comprising a support (10) carrying a seat (20), which is tiltable around an axis between a substantially horizontal sitting position and a position declining forwards, furthermore two elbow-rests (13), firmly fixed to the support at opposed side edges of the seat (20),
characterised in
that said axis with the seat (20) can be risen and lowered between an upper and a lower position, and that the axis with the seat (20) is spring prestressed towards the upper position by at least one spring means (32).

2.
A chair according to claim 1,
characterised in
that the seat (20) is tiltable around a geometric axis, which is substantially centrally located between the fore and the back edges of the seat.

3.
a chair according to claim 1 or 2,
characterised in
that two spring means in the form of pressure springs (32) are arranged at each side of the seat (20), whereas each pressure spring (32) at its upper end is connected to the seat (20) via a seat holder (25) and at its lower end is connected to the support (10).

4.
A chair according to claims 1 - 3,
characterised in
that the seat (20) is arranged to tilt forwards when it is at the upper position.

5.
A chair according to any of the preceding claims,
characterised in
that the seat (20) is arranged to take a substantially horizontal attitude in the lower position.

6.

A chair according to any of the preceding claims,

characterised in

that the seat (20) is lockable in the lower position.

7.

A chair according to any of the preceding claims,

characterised in

that a back rest (22) is firmly connected to the seat (20) for mutual movement therewith.

8.

a chair according to any of claims 1 - 6,

characterised in that

the seat (20) comprises a seat ring (21) for a WC chair and that the support (10) is adapted to mounting at a WC chair.

9.

A chair according to any of claims 1- 7,

characterised in

that the chair is designed like a wheel-chair, whereas the support is provided with wheels.

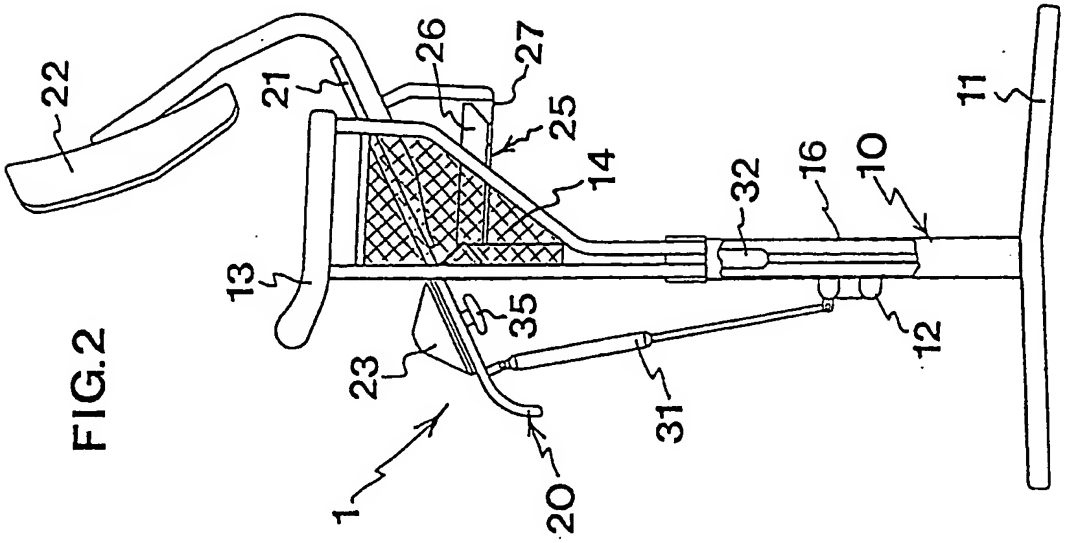
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FIG.2

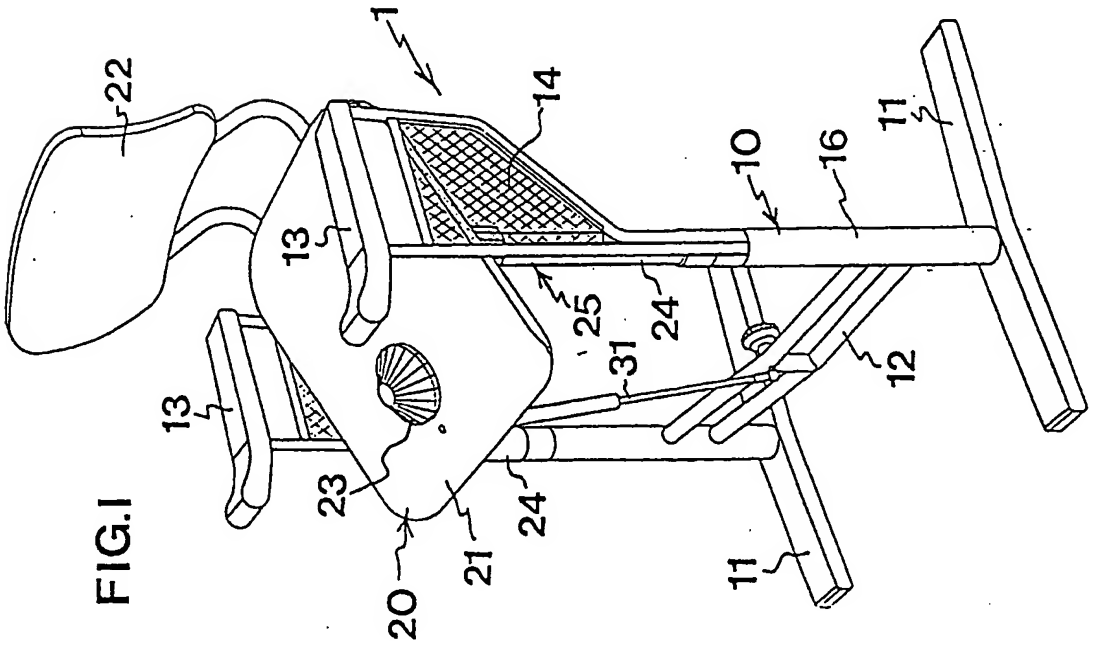
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FIG.1

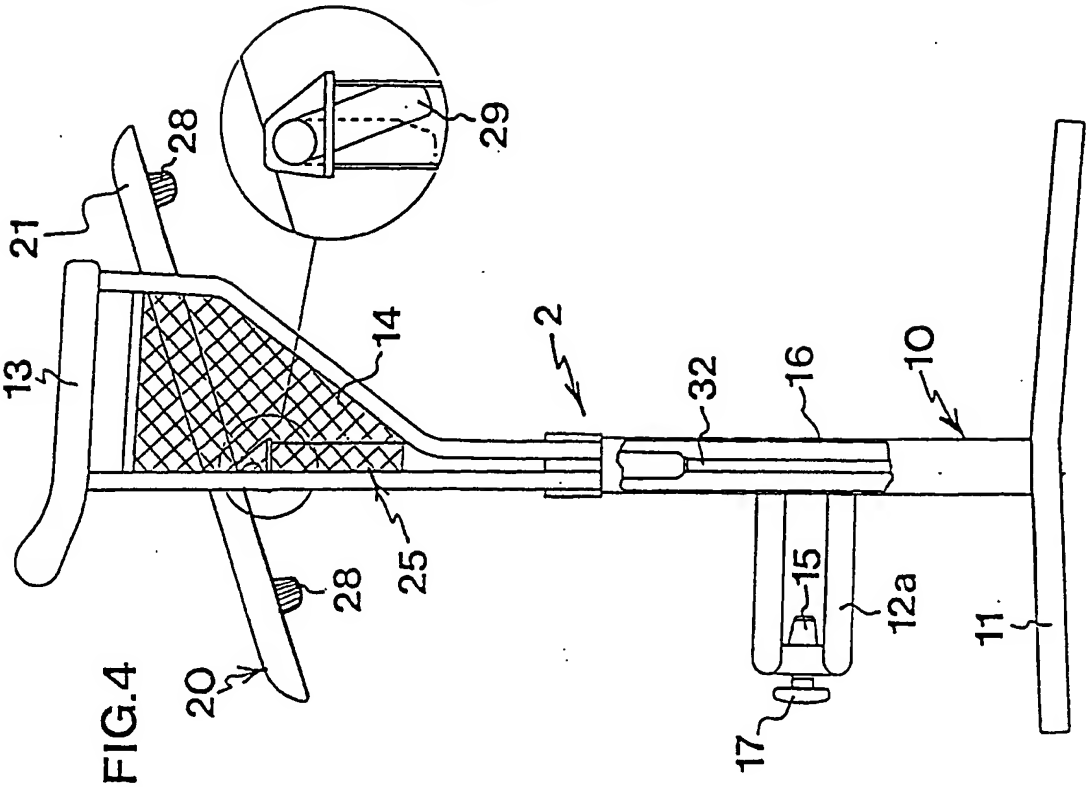
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FIG.4

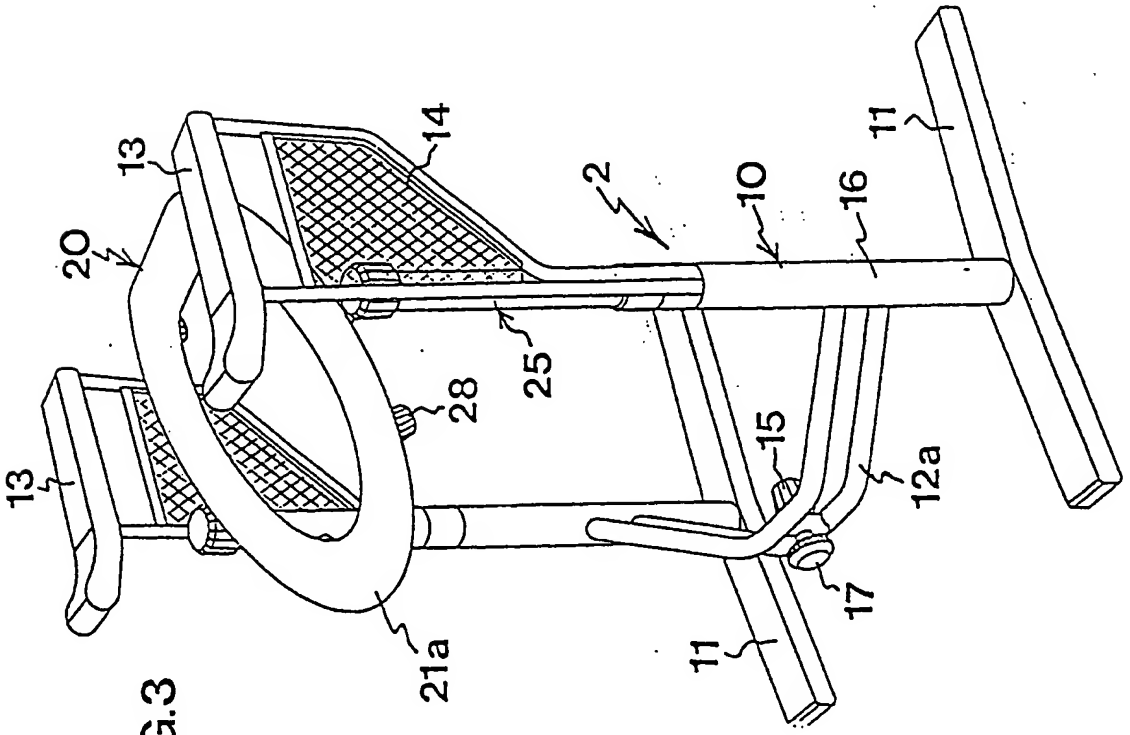
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FIG.3

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE 97/02106

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: A61G 5/14
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: A61G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CH 681059 A5 (DR. CONRAD R DEUCHER), 15 January 1993 (15.01.93), column 2, line 21 - line 41 --	1-9
X	US 4884841 A (ROBERT E HOLLEY), 5 December 1989 (05.12.89), column 5, line 46 - line 54; column 4, line 33 - line 38 --	1-9
A	GB 2181047 A (LINCOLN FREDERICK BAIRD), 15 April 1987 (15.04.87), page 2, line 24 - line 61 --	1

[X] Further documents are listed in the continuation of Box C. [X] See patent family annex.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE 97/02106

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	SE 469316 B (HENNING BERGENWALL), 21 June 1993 (21.06.93), see whole document ---	1
A	GB 1363229 A (BATH INSTITUTE OF MEDICAL ENGINEERING), 14 August 1974 (14.08.74), see whole document --- --------	1

INTERNATIONAL SEARCH REPORT

Information on patent family members

02/03/98

International application No.
PCT/SE 97/02106

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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US 4884841 A	05/12/89	NONE	
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		US 4907303 A	13/03/90
SE 469316 B	21/06/93	EP 0607362 A	27/07/94
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